

# **Mercury Continuous Emission Monitor Program at the Energy & Environmental Research Center**

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## **Abstract**

With the decrease in mercury emissions from other sources, recent attention has focused on mercury emissions from coal-fired utility boilers. U.S. Environmental Protection Agency (EPA) Methods 101A and 29 have been validated for measuring total mercury emissions from coal-fired boilers. The Ontario Hydro method has recently been validated for mercury speciation measurements in coal combustion flue gas. However, these wet-chemistry methods are difficult to perform, costly, time-consuming, and labor-intensive. Also, the results typically are not available for several days. Therefore, development of a continuous emission monitor (CEM) requiring minimal operator input to provide near-real-time mercury emission data that could be used as feedback control for mercury control systems is attractive.

Several on-line analyzers have been developed primarily for measuring mercury emissions from waste incinerators. However, application of these mercury CEMs to the flue gas from coal-fired boilers presents significant challenges. Typically, the flue gas mercury concentration is less than  $10 \mu\text{g}/\text{Nm}^3$  and contains fine particulate that must be removed prior to mercury measurement. Also, the presence of acid gases including HCl and  $\text{SO}_2$  may interfere with the analyzers.

The Energy & Environmental Research Center (EERC) has evaluated several mercury CEMs at the bench-, pilot-, and full-scale level by comparing the results to standard wet-chemistry methods. In addition, several field tests have been done using a pretreatment/conversion system developed at the EERC so the CEMs can be used to speciate mercury. The results showed that the Perkin Elmer MERCEM, PS Analytical Sir Galahad, and Semtech Hg 2000 have the capability of measuring total vapor-phase mercury in coal combustion flue gas within  $\pm 20\%$  of the wet-chemistry methods. Since these tests were of short duration, additional field testing is necessary to resolve questions regarding accuracy, reliability, and maintainability before mercury CEMs can be used routinely for mercury measurement in utility flue gas applications.